

What is claimed is:

- 1           1.     A timeslot assignment method for a communication system in  
2     which a plurality of end-user systems are connected to a timeslot assignment  
3     unit via a common transmission medium, each of said end-user systems  
4     comprising a buffer for storing packets of either variable or constant length  
5     and forwarding packets from said buffer on assigned timeslots, the method  
6     comprising the steps of:
- 7           a)     determining a first count number of said packets in the buffer of  
8     each of said end-user systems;
- 9           b)     determining a second, total count number of timeslots  
10    previously assigned to each end-user system during a delay time period of  
11    said timeslot assignment unit;
- 12          c)     using said first and second count numbers for determining a  
13    third count number of packets in said buffer to which timeslots are still not  
14    assigned; and
- 15          d)     assigning timeslots to packets of each end-user system based on  
16    said third count number.
- 1           2.     A timeslot assignment method as claimed in claim 1, wherein  
2     said third count number equals a difference between said first and second  
3     count numbers.
- 1           3.     A timeslot assignment method as claimed in claim 1, wherein  
2     the step (d) assigns said timeslots on a round-robin basis.

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1           4.     A timeslot assignment method as claimed in claim 1, wherein  
2     the step (d) assigns said timeslots in proportion to said third count number.

1           5.     A timeslot assignment method as claimed in claim 1, wherein  
2     the step (d) comprises the steps of:

3           d<sub>1</sub>)    arranging the third count numbers of said end-user systems in  
4     descending order of rank;

5           d<sub>2</sub>)    setting integer N to one;

6           d<sub>3</sub>)    detecting a difference between the third count number arranged  
7     in a rank represented by the integer N and the third count number arranged  
8     in a rank represented by integer (N + 1);

9           d<sub>4</sub>)    assigning timeslots corresponding in number to said difference  
10    to packets of N end-user systems whose third count numbers are arranged in  
11    said descending order; and

12          d<sub>5</sub>)    incrementing the integer N by one and repeating the steps (d<sub>3</sub>)  
13    and (d<sub>4</sub>).

1           6.     A timeslot assignment method as claimed in claim 1, wherein  
2     said packets are ATM cells.

1           7.     A communication system comprising:

2     a plurality of end-user systems; and

3     a timeslot assignment unit connected via a common transmission  
4     medium to said end-user systems,

5     each of said end-user systems comprising:

6         a buffer for storing packets of either variable or constant length;

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7 a queue length detector for detecting a queue length indicating  
8 a count number of said packets in the buffer; and  
9 a controller for forwarding packets from said buffer on  
10 timeslots assigned by said timeslot assignment unit and transmitting a signal  
11 to said timeslot assignment unit for indicating the detected queue length,  
12 said timeslot assignment unit comprising:  
13 a timeslot count table having a plurality of entries  
14 corresponding to said end-user systems, each of the entries having a length  
15 corresponding to a delay time period of said timeslot assignment unit for  
16 storing a plurality of count numbers of assigned timeslots; and  
17 a controller for (a) determining a total value of count numbers  
18 stored in each entry of said timeslot count table, (b) receiving the queue  
19 length indicating signal from each of said end-user systems, (c) using said  
20 total count number and the received queue length for determining a virtual  
21 queue length of each end-user system indicating a count number of packets  
22 in said buffer to which timeslots are still not assigned, (d) assigning timeslots  
23 to each end-user system based on said virtual queue length, and (e) storing a  
24 count number of the assigned timeslots in an entry of said timeslot count  
25 table corresponding to said each end-user system.

1 8. A communication system as claimed in claim 7, wherein said  
2 virtual queue length equals a difference between said total count number and  
3 the received queue length.

1 9. A communication system as claimed in claim 7, wherein the  
2 timeslot assignment unit assigns said timeslots on a round-robin basis.

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1           10.    A communication system as claimed in claim 7, wherein the  
2   timeslot assignment unit assigns said timeslots in proportion to said virtual  
3   queue length.

1           11.    A communication system as claimed in claim 7, wherein the  
2   timeslot assignment unit performs the functions of:  
3           arranging the third count numbers of said end-user systems in  
4   descending order of rank, setting integer N to one;  
5           detecting a difference between the third count number arranged in a  
6   rank represented by the integer N and the third count number arranged in a  
7   rank represented by integer (N + 1);  
8           assigning timeslots corresponding in number to said difference to  
9   packets of N end-user systems whose third count numbers are arranged in  
10   said descending order; and  
11          incrementing the integer N by one and repeating the functions of  
12   detecting said difference and assigning said timeslots.

1           12.    A communication system as claimed in claim 7, wherein said  
2   packets are ATM cells.

1           13.    A communication system comprising:  
2           a plurality of end-user systems; and  
3           a timeslot assignment unit connected via a common transmission  
4   medium to said end-user systems,  
5           each of said end-user systems comprising:  
6           a buffer for storing packets of either variable or constant length;

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7 a queue length detector for detecting a queue length indicating  
8 a count number of said packets in the buffer;  
9 a memory having a length corresponding to a delay time of said  
10 timeslot assignment unit for storing a plurality of count numbers of assigned  
11 timeslots; and  
12 a controller for forwarding packets from said buffer on  
13 timeslots assigned by said timeslot assignment unit, determining a total value  
14 of the count numbers stored in said memory, determining, from said total  
15 value and said queue length, a virtual queue length indicating a count  
16 number of packets in said buffer to which timeslots are still not assigned, and  
17 transmitting a signal to said timeslot assignment unit for indicating the  
18 virtual queue length,  
19 said timeslot assignment unit receiving the virtual queue length  
20 indicating signal from each of said end-user systems and assigning timeslots  
21 to each end-user system based on the received virtual queue length.

1 14. A communication system as claimed in claim 13, wherein said  
2 virtual queue length equals a difference between said queue length and said  
3 total value.

1 15. A communication system as claimed in claim 13, wherein the  
2 timeslot assignment unit assigns said timeslots on a round-robin basis.

1 16. A communication system as claimed in claim 13, wherein the  
2 timeslot assignment unit assigns said timeslots in proportion to said virtual  
3 queue length.

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1 17. A communication system as claimed in claim 13, wherein the  
2 timeslot assignment unit performs the functions of:  
3 arranging the third count numbers of said end-user systems in  
4 descending order of rank, setting integer N to one;  
5 detecting a difference between the third count number arranged in a  
6 rank represented by the integer N and the third count number arranged in a  
7 rank represented by integer (N + 1);  
8 assigning timeslots corresponding in number to said difference to  
9 packets of N end-user systems whose third count numbers are arranged in  
10 said descending order; and  
11 incrementing the integer N by one and repeating the functions of  
12 detecting said difference and assigning said timeslots.

1 18. A communication system as claimed in claim 13, wherein said  
2 timeslot assignment unit comprises:  
3 a first controller for transmitting a signal to each of said end-user  
4 systems for indicating a count number of said assigned timeslots for storing  
5 the count number into the memory of each end-user system; and  
6 a second controller for transmitting a position signal representing  
7 timeslot positions of the timeslots assigned by the first controller to each of  
8 said end-user systems.

1 19. A communication system as claimed in claim 13, wherein said  
2 packets are ATM cells.

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